



Product variety strategy for improving new product development proficiencies

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Abstract

Based on a cross-industry sample of 103 Korean manufacturers, this study examines the role of new product development proficiencies for platform and derivative projects. The results of this study show that companies pursuing a higher degree of platform-based product variety perceive that they have to more proficiently execute process-planning, marketing, and technical activities for the platform project to improve product family technical success compared to companies emphasizing a lower degree of platform-based product variety. However, only superior execution of marketing activities for derivative projects appear to facilitate product family technical success. Our results stress the primacy of marketing capabilities, relative to process-planning and technical proficiencies, in improving product family technical performance. Mediation regression analyses suggest that, for higher product variety firms, commercial success of the product family may not be conditional upon superior execution of these activities relative to their lower product variety counterparts. The article concludes with discussion of implication for practice, theory and research.

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1. Introduction

In markets characterized by diverse customer needs and wants, a single product seldom meets the needs of an entire market. Organizations may compete by introducing more new products than the average competitor. However, new product development (NPD) costs can dramatically escalate when firms develop a large number of unique products that do not share common design, engineering, and manufacturing. Firms, therefore, try to satisfy multiple market segments by using common platforms—defined as component and subsystem assets shared across a family of products (Robertson and Ulrich, 1998)—to generate product variants and modifications which may be launched simultaneously or sequentially. Platform-based product variety, reflecting the push toward mass customization, has become the focal point of competition for many firms (Pine, 1993). For instance, in the PC market, there are over 2000 different models being offered for sale (Bayus and Putsis, 1999).

Although platforms enable firms to efficiently expand their product portfolio, research evidence to support a positive relationship between platform-based product variety and product family performance is mixed. Some studies show that business units with broader product lines relative to competition have higher market share and profitability (e.g. Kekre and Srinivasan, 1990). Although these studies did not explicitly focus on platform-based product variety, by implication, firms are more likely to enhance market competitiveness and profitability by using common platforms to create desired product variety. As noted by Meyer and Utterback (1993) and Meyer and Lehnerd (1997), platform-based product development can be beneficial by enabling firms to offer more product variety at lower costs. By contrast, in a study of one firm over a 5-year period, Hauser (1999) shows that the platform approach does not always improve product line profitability. Others also have highlighted the limitations of using platforms, such as the loss of product differentiation (Robertson and Ulrich, 1998), over-design costs, and loss of product quality (Krishnan and Gupta, 2001).

The extant literature on platforms has largely addressed the cost-benefit implications and impacts of platform-based product development with respect to consumer preference

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or demand, and elements of the development process, such as component selection, process design, and product planning. Much of prior work also tended to focus on a single industry or company, so conclusions may not be generalized to a wider set of firms (e.g. Hauser, 1999; Krishnan and Gupta, 2001; Ramdas and Sawhney, 2001), while others lack formal empirical testing (e.g. Desai et al., 2001). Although previous work has advanced our understanding of the role of platform-based product development in achieving cost-effective variety, more empirical research is needed to understand the relationships between platform development strategies, activities, and product family performance.

Our study extends current work by examining how platform products and product variant development proficiencies influence product family outcomes within a cross-industry sample of companies. We identify with two types of projects, namely platform and derivative. The former refers to the initial project which develops the platform and the commercialization of the initial product whereas a derivative project involves the development of the product variant that reuses the existing platform (Tatikonda, 1999). In contrast, higher product variety firms face additional challenges of mounting more development projects, that must be coordinated around a basic platform, as well as differentiating multiple variants. Failure to meet these demands and to proficiently plan and execute requisite platform and variant development projects may be one reason for the contradictory results reported for the links between platform-based product variety and firm's performance. Our key research question is: To what extent does the fit between specific NPD proficiencies and the firm's degree of product variety impact product family performance?

We focus on South Korean (Korean hereafter) NPD within the context of platform-driven product family expansion. In recent years, there has been increasing interest in identifying NPD success factors for firms from Korea and other Asian countries (e.g. China, Japan, and Taiwan) (Xie et al., 1998; Song and Parry, 1997a; Calantone et al., 1996; Song and Montoya-Weiss, 2001). This interest is partly due to the growing importance of Asia, and, especially the Asia Pacific region, to world trade and output. In particular, following a period of restructuring since the Asian financial crisis in 1997, Korea is returning to strong growth, an economic resurgence that is also dependent on the creation of competitive new products for sale worldwide (Moon, 2001). The emerging literature on Korean NPD largely focuses on the determinants of new product performance. Our study, however, adds to the existing body of knowledge by both building on the results of prior studies, and examining the relevance of NPD proficiencies with respect to platform-based product development. Although our study's contribution is through application, the latter pertains to a fast rising East Asian economy, which provides useful generalizability and perspective to previous studies.

The rest of this article is organized as follows. First, we present the conceptual framework and research hypotheses. Then, we describe the methodology and data analyses, followed by the presentation and discussion of our findings. We conclude with a discussion of the managerial implications, and, taking into account the study's limitations, we offer some recommendations for future research.

2. Conceptual background

The extant NPD literature highlights the significant, positive influence of developers' ability to execute NPD activities on NPD performance (Montoya-Weiss and Calantone, 1994; Henard and Szymanski, 2001; Baron and Kenny, 1986). Previous studies confirm the significant role of marketing proficiency in enhancing NPD success in North America and Europe (e.g. Cooper, 1979; Maidique and Zirger, 1984; Rothwell et al., 1974) and in other national contexts, including Korea, Taiwan, Japan, and China (e.g. Song and Parry, 1997a, 1996; Mishra et al., 1996; Calantone et al., 1996). In a study of Canadian, Chinese, and South Korean firms' NPD practices, Mishra et al. (1996) identify both marketing and technical proficiencies as keys to new product success. Technical (technological and production) capabilities have also been associated with new product success in a range of country environments (e.g. Cooper, 1979; Maidique and Zirger, 1984; Song et al., 1997). In addition, previous work also identified NPD process-planning proficiency as a significant driver of new product success in Western (e.g. von Hippel, 1990) and Asian companies (e.g. Olson et al., 1995).

To a great extent, the afore-mentioned NPD proficiencies have been widely treated as generic NPD capabilities, irrespective of the project type or the extent to which new products are developed using unique or shared platforms. A number of researchers have argued that some proficiencies are relatively *more* important than others in enhancing NPD performance for a specific project (Kleinschmidt and Cooper, 1995) and that NPD success in some countries is more reliant on one form of proficiency than others (Mishra et al., 1996). The relative importance of NPD proficiencies in influencing NPD outcome may be rationalized using a contingency theory perspective. Contingency theory (Chandler, 1962) advocates the concept of 'fit' between strategic and organizational behaviors in determining organizational performance. Previous research has investigated the links between a firm's strategic orientation and a firm's innovation efforts or new product success. For example, in an NPD context, Atuahene-Gima (1996) shows that firms pursuing a market-oriented strategy are more likely to facilitate inter-functional teamwork which influences performance. Others argue that a stronger customer orientation and superior technological orientation will have a favourable impact on new product outcome (Desphande et al., 1993; Gatignon and Xuereb, 1997).

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